Testimony of Andrew Young

Exhibit 22-2 (AY-2) to the Testimony of Andrew Young

REVISED PROJECT DESCRIPTION BASED UPON THE KITTITAS COUNTY, KITTITAS VALLEY WIND POWER PROJECT DEVELOPMENT ACTIVITIES APPLICATION FILED OCTOBER 14, 2005 AS DESCRIBED IN THE EFSEC ADDENDUM TO THE DEIS

CHAPTER 2: PROJECT DESCRIPTION

In order to assist the reader to identify the project elements that have changed, text relating to changes to the project has been underlined in sections that substantially repeat information originally presented in the Draft EIS.

2.1 Project Overview

This section of the Addendum updates the project overview presented in Section 2.2.1 of the Draft EIS.

Sagebrush Power Partners LLC proposes to construct and operate a series of wind turbines that would harness the natural wind at the proposed KVWPP site in Kittitas County, Washington. The project would install three-bladed wind turbines on tubular steel towers ranging in size from 1.8 MW to 3 MW (generator nameplate capacity) in the project area. Energy from the spinning turbines will be turned into up to 246 megawatts of power. Elements of the project include wind turbine generators, roads, foundations, underground and overhead electrical lines, grid interconnection facilities, one or two substations, an operations and maintenance (O&M) facility, and associated supporting infrastructure and facilities.

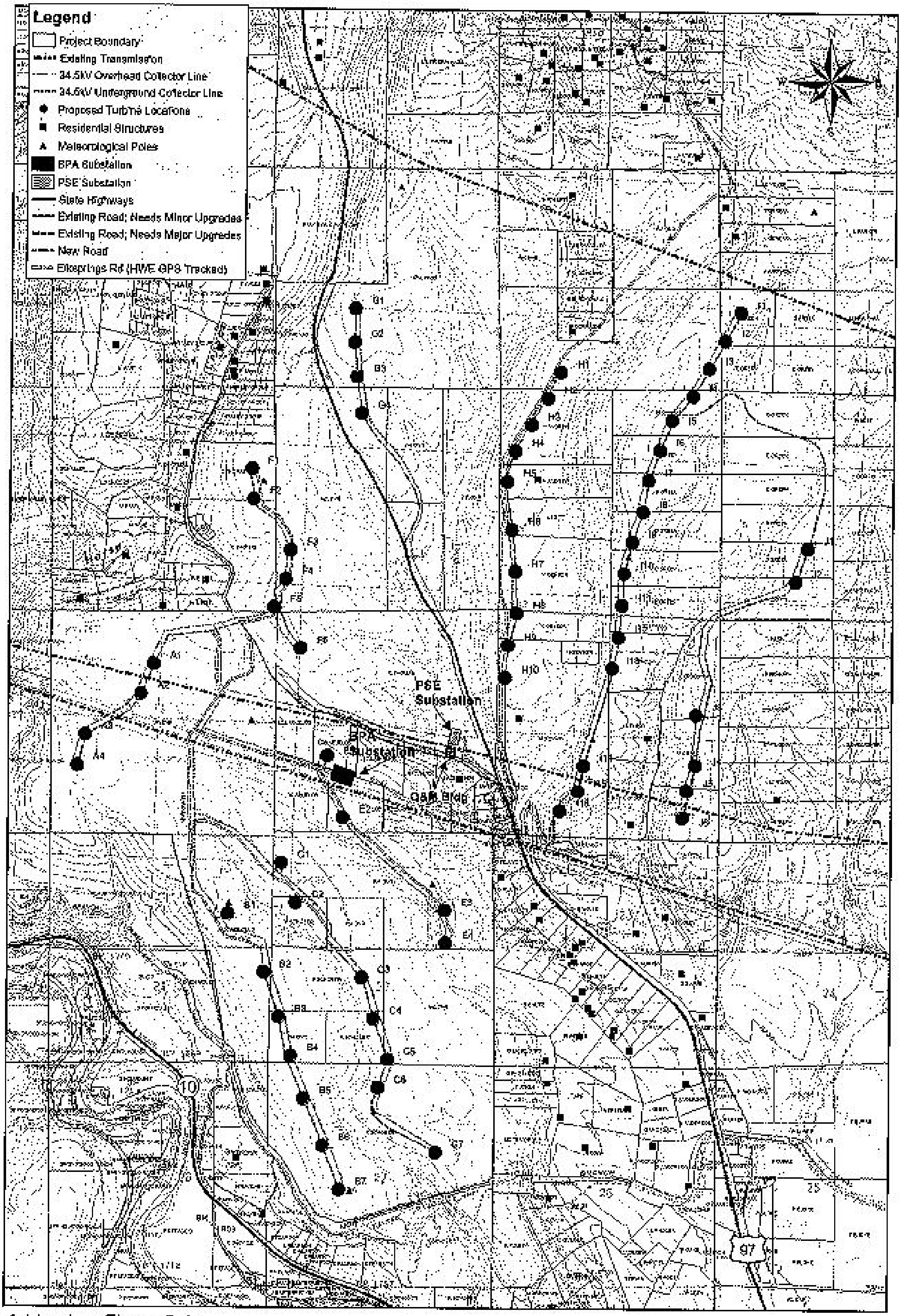
To capture a "reasonable range" of potential project impacts, the Draft EIS defined and evaluated the following three project scenarios:

- Lower End Scenario: The lower end scenario represents the project configuration with the lowest number of turbines erected. For turbines with a nameplate capacity of 3 MW, up to 82 turbines would be used, resulting in nameplate capacity of 246 MW.
- Middle Scenario: For turbines with a nameplate capacity of 1.5 MW each, 121 turbines would be used for a total for a total of 181.5 MW. This scenario is illustrated in Figure 2-1.
- Upper End Scenario: The upper end scenario represents the project configuration with the highest number of turbines erected. For turbines with a nameplate capacity of 1.3 MW each, up to 150 turbines would be used, resulting in a project total nameplate capacity of 195 MW.

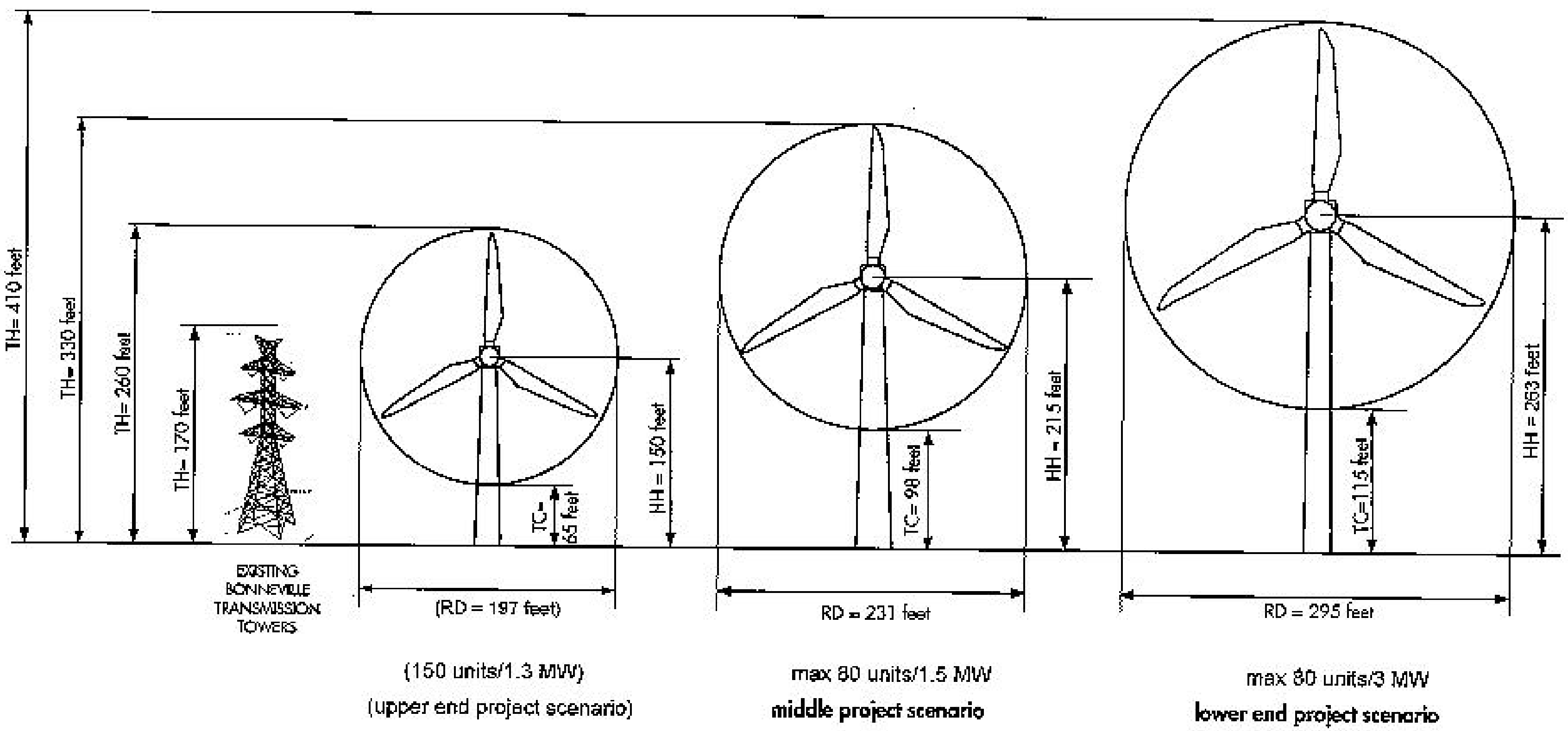
With its submittal of the Development Activities Application (DAA) to Kittitas County, Sagebrush Power Partners has indicated that the project would most likely implement turbines ranging in size from 1.8 MW to 3 MW, i.e. a configuration in the Middle to Lower End Scenario range. In the DAA Sagebrush requests to construct a maximum of 80 turbines with a maximum project nameplate capacity up to 246 MW.

Addendum Figure 2-1 illustrates the general site layout of these key elements as revised in the October 2005 DAA. Addendum Figure 2-2 illustrates the maximum dimensions not be exceeded of the three project scenarios.

Tables 2-1 and 2-2 of the Draft EIS summarized the proposed project facilities and the total area that would be permanently and temporarily occupied, respectively, by each project element for the three defined project scenarios. The data presented for the Middle and Lower End Scenarios does not change with the revised turbine layout. The permanent project footprint (for the life of



Addendum Figure 2-1:
Kittitas Valley Wind Power Project
Revised Site Layout
Source: Schafer 2006l



Source: Sagebrush Power Partners LLC 2003a, 2005a

HH hub height
RD rotor diameter
TC tip clearance
TH tip height

Addendum Figure 2-2:
TYPICAL WIND TURBINE DIMENSIONS

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the project) would occupy between 93 and 118 acres for wind turbines, access roads, substations, and other facilities. Between approximately 231 and 371 acres would be temporarily occupied during construction by facilities such as staging areas and equipment laydown areas. The only features that would vary in size between the project scenarios would be the temporary laydown areas at each wind turbine during construction and the permanent roadway and turbine and transformer pad footprints; under the lower end scenario, roads would be wider to accommodate larger construction cranes. The amount of land disturbance required for the operations and maintenance facility, substations, and meteorological towers would not change under the three scenarios.

Up to 80 turbines would be arranged in numerous "strings" labeled A through J throughout the project site, for a maximum of 23 total miles of turbine strings (Addendum Figure 2-1). The length of the 9 turbine strings would remain constant under the three project scenarios; only the density of turbines sited within each string would change. The height of the turbines (referred to as the "tip height") would range from about 260 feet to 410 feet from the ground to the blade tip in its highest position, depending on the turbine size selected (see Addendum Figure 2-2). In any scenario chosen by the Applicant only a single size of turbines would be used; different sizes of turbines would not be mixed.

The Draft EIS reported that up to 7 miles of existing private roads would be improved, and up to 19 miles of new access roads would be constructed to access and service the wind turbines and other facilities at the site. With the project layout revisions, the miles of new road would be reduced to approximately 13. One O&M facility, approximately 5,000 square feet on a 2-acre site, also would be constructed. Electrical lines would be installed to connect the turbines and strings (see Addendum Figure 2-1). Lines connecting individual turbines in each string would be located underground, and lines connecting the strings primarily would be underground with some overhead.

2.2 Project Location and Project Site

This section of the Addendum updates the description of project location and project site presented in Section 2.2.2 of the Draft EIS.

The project is located on open ridgetops between Ellensburg and Cle Elum, about 12 miles northwest of the City of Ellensburg in Kittitas County, Washington. The estimated 90-acre project site lies within an area covering approximately 3.5 miles (east-west) by 5 miles (north-south). For purposes of this EIS, the terms "project site" and "project area" are defined as follows:

- Project site: Actual locations within the project area where construction and operation activities would occur. As explained in more detail below, the project site will change with the revised KVWPP layout.
- Project area: The general area that surrounds the project site; this includes the tax parcels where all project facilities are proposed. The project area has not changed as a result of the October 2005 revised KVWPP layout.

Project site ridges rise as high as 1,300 feet above the surrounding valley floor. Strong northwest winds in the project area are compressed as they pass by Lookout Mountain and are further accelerated as they pass over the site's ridgetops. The center of the site is located approximately at the intersection of the main Bonneville Power Administration (Bonneville) and the Puget Sound Energy (PSE) east-west transmission line corridors with US 97.

Under the Lower End Scenario, wind turbines would be installed along roadways as shown in Addendum Figure 2-1. The layout design is based on wind turbines with a rotor diameter of approximately 295 feet. Because of possible variances that may be discovered during the final site survey, some flexibility in determining the exact facility locations is required. Generally, it will not be necessary to relocate roads significantly from their proposed locations; however, the exact location of the turbines along the planned roadways may need to be altered from the plan shown in Addendum Figure 2-1 because of a number of factors including:

- The results of geotechnical investigations to be conducted at each surveyed turbine location may reveal underground voids or fractures. In this case, the turbine location may need to be altered or eliminated.
- The final onsite field survey with the meteorologists may dictate that turbines be spaced slightly closer together in some areas and farther apart in other areas.
- Turbine spacing may be adjusted based on the final rotor diameter selected.
- The final field measurement test surveys of communication microwave paths may require that some turbine locations be adjusted slightly to avoid line-of-sight interference.

Given that rotor diameters proposed for the wind turbines would range from approximately 200 feet under the upper end scenario to 295 feet under the lower end scenario, turbines would not vary from their proposed locations by more than 350 feet. Adjustments to final turbine tower locations would not bring them closer to public roads, power lines, property lines of non-participating landowners, or residences; the setbacks currently shown in Addendum Figure 2-1 would be not be reduced.

Addendum Figure 2-1 also shows property ownership at the time the DAA was submitted to Kittitas County.

Project Setbacks

The minimum setbacks incorporated into the proposed project layout are based on several factors, including safety and avoidance of nuisance concerns, industry standards, and on the Applicant's experience in operating wind power projects. Some are fixed distances (i.e., 1,000 feet) that are based on estimates or modeling of potential nuisance impacts such as noise and shadow-flicker. Others, such as tip height, are related to the size of the actual turbines to be installed. (Tip height refers to the total distance from the base of the turbine to the tip of the blade at its highest point; see Addendum Figure 2-2.) Tip height setbacks are primarily safety-related (e.g., if an entire tower and turbine were to collapse from a massive earthquake either combined with or independent from hurricane force wind, they would not fall on a public road or a neighbor's property). The proposed setbacks for the project's proposed turbine towers are as follows (Sagebrush Power Partners LLC 2003c, Section 2.3.12; Sagebrush Power Partners LLC 2005):

- Setback from residences of neighboring landowners (i.e., those without signed agreements with the Applicant): 1,000 feet.
- Setback from property lines of neighboring landowners: this setback has been increased to 541 feet beyond the tip of the blade at its closest point to the property line.
- Setback from residences with signed agreements with the Applicant: At least blade tip height. However, it may be greater based on the property owner's approval. Some landowners want to have turbines closer than 1,000 feet to their residence in exchange for more turbines on their land and the revenue generated by them.
- Setback from property lines of landowners with signed agreements with the Applicant: None. All property owners with signed agreements with the Applicant have agreed to a zero setback from property lines, as this allows the most efficient and lowest impact of wind turbines on various landowners' property.
- Setback from Bonneville/PSE transmission lines: Blade tip height.
- Distance from county/state roads: Turbine tip height.

Minor adjustments would be made to the proposed project layout such as moving the turbine tower foundations to maintain the setbacks described above. The proposed setback for the meteorological towers from public roads and residences is tip height. There are no designated setbacks for the other project components such as the O&M facility, substations, and gravel access roads.

2.3 Facilities

This section of the Addendum updates the description of project facilities presented in Section 2.2.3 of the Draft EIS.

The project would be located on privately-owned open rangeland and rangeland owned by DNR pursuant to leases negotiated between the landowners and the Applicant. These leases would allow construction and operation of wind facilities for a negotiated term. In exchange, each landowner leasing property would receive financial compensation.

The project would consist of wind turbines, associated electrical systems (including an electrical collector system, substations, and interconnection facilities), meteorological towers, access roads, and an operation and maintenance building (see Addendum Figure 2-1). Each of these features is described in more detail below.

Wind Turbines

Wind turbines consist of three main components—the turbine tower, nacelle, and rotor blades.

The design features for the 1.3- to 3-MW wind turbines considered in the Draft EIS (see Draft EIS Table 2-4 below) still represent the boundaries for the project description range, and as a result, only the Tower hub height for the Lower End Scenario has increased by 1 foot.

Revised Draft EIS Table 2-4: Wind Turbine Features, Kittitas Valley Wind Power Project

Design Feature	Description		
	(Upper End Scenario) [1]	Middle Scenario	Lower End Scenario
Rated output of turbine	(1.3 MW)	1.5 MW	3 MW
Number of turbines	(150)	80	80
Axis	(Horizontal)	Horizontal	Horizontal
Rotor orientation	(Upwind)	Upwind	Upwind
Minimum wind speed for turbines to begin operating	(7-10 miles per hour[2])	7-10 miles per hour[2]	7-10 miles per hour[2]
Number of blades	(Three)	Three	Three
Rotor (blade) diameter	(197 feet)	231 feet	295 feet
Tower type	(Tubular steel)	Tubular steel	Tubular steel
Tower hub (nacelle) height	(150 feet)	215 feet	263 feet
Total (tip) height (to top of vertical rotor)	(260 feet)	330 feet	410 feet
Rotational speed	(10-23 rotations per minute)	10-23 rotations per minute	10-23 rotations per minute
Nacelle	(Fully enclosed steel or steel or reinforced fiberglass)	Fully enclosed steel or steel reinforced fiberglass	Fully enclosed steel or steel reinforced fiberglass
Color	(Neutral gray)	Neutral gray	Neutral gray

Source: Sagebrush Power Partners LLC 2003a; Sagebrush Power Partners LLC 2005.

1 With the Revised Development Activities Application, the Applicant no longer proposes the Lower End Scenario as a likely project configuration.

2 Wind turbines rotate in winds as low as 2-3 mph, but generator cut-in occurs at 7-10 mph.

Towers

Towers would be approximately 150 to 263 feet tall at the turbine hub (referred to as the "hub height") under the upper and lower end scenarios, respectively. With the nacelle and blades mounted, the total height of the wind turbine ("tip height") would be approximately 260 to 410 feet with a blade in the vertical position. The towers would be a tubular conical steel structure manufactured in multiple sections depending on the tower height and approximately 12 to 16 feet in diameter at the base. The towers would be painted a neutral gray color to be visually less obtrusive. A service platform at the top of each section would allow for access to the tower's connecting bolts for routine inspection. A ladder inside the structure would ascend to the nacelle to provide access for turbine maintenance. The tower would be equipped with interior lighting and a safety glide cable alongside the ladder.

The towers would be fabricated and erected in two to four sections. Turbine tower sections would be transported to the site on trailers that could each carry one tower section per truck. Tower sections would be delivered by truck to a staging area and then to each tower location. They would be erected using a large construction crane.

Nacelle

The nacelle houses the main mechanical components of the wind turbine generator—the drive train, gearbox, and generator. The nacelle would be equipped with an anemometer and a wind vane that signals wind speed and direction information to an electronic controller. A mechanism would use electric motors to rotate (yaw) the nacelle and rotor to keep the turbine pointed into the wind to maximize energy capture. An enclosed steel-reinforced fiberglass shell houses the nacelle to protect internal machinery from the elements.

Rotor Blades

Modern wind turbines have three-bladed rotors. The diameter of the circle swept by the blades would range from approximately 200 to 300 feet under the upper and lower end scenarios, respectively (that is, each blade would be approximately 100 to 150 feet long). The blades would turn at about 10 to 23 rotations per minute (RPM). Newer turbines representative of those considered for the Lower End Scenario range turn at about 17 to 20 RPM. Generally, larger wind turbine generators have slower rotating blades, but the specific RPM values depend on aerodynamic design and vary across machines. The rotor blades would be typically made from glass-reinforced polyester composite.

Electrical System

The project's electrical system would have two key elements: (1) a collector system, which would collect energy at between 575 and 690 volts (V) from each wind turbine (depending on the type of turbine used), increase it to 34.5 kilovolts (kV) through a pad-mounted transformer, and connect to the project substations; and (2) the substations and interconnection facilities, which would transform energy from the collection lines (at 34.5 kV) to the transmission level (230 kV for the PSE line and Bonneville's Columbia to Covington line or 287 kV for Bonneville's Grand Coulee to Olympia line). A schematic of the electrical collection system and interconnection facilities was shown in Draft EIS Figure 2-5.

Collector System

Power from the wind turbines would be generated at 575 V to 690 V depending on the type of wind turbine used for the project. A set of heavy gauge, armored, flexible drop cables would connect to the generator terminals in the nacelle and would pass from the nacelle into the tower where they would drop down to a cable support saddle located about 20 to 30 feet below the top tower platform. From the support saddle, the cables would be directed along the inside of the tower, along the internal ladder in cable trays, or they would be hung straight down to the base bus cabinet and breaker panel inside the base of the tower. The drop cables would terminate inside the bus cabinet. Another set of cables would run from the bus cabinet through conduits in the foundation to the pad transformer, ranging in size from 50 to 120 square feet in area; the pad transformer would step up the voltage to 34.5 kV. Some wind turbine generators, such as the Vestas V-80, have the transformer in the nacelle. For the V-80, the drop cables would be at 34.5 kV, and the base bus cabinet would be a switchgear breaker panel. Some generator models may require that the transformer be mounted on an adjacent outdoor concrete pad. (Sagebrush Power Partners LLC 2003c, Section 2.3.4; Sagebrush Power Partners LLC 2005).

From the transformer, power from the turbine would be transmitted by underground 34.5 kV electrical cables installed in a trench typically 3 to 4 feet deep, depending on the underlying soil and rock conditions, and up to 5 feet wide. Underground collection cables would be used in most areas; overhead collectors on wood structures would be used where there are steep slopes or canyons to cross (see Addendum Figure 2-1). Approximately 23 miles of underground and 2 miles of overhead 34.5 kV electrical power lines would be used to collect power from the turbines and terminate at the main substation.

An estimated 1.2-mile section of the overhead system would be along Bettas Road parallel to two existing sets of overhead transmission lines and the access road that serves them. Another overhead section is proposed to link turbine strings B and C. In the original site layout (Addendum Figure 2-1), this connection was shown as either underground or overhead. Based on subsequent input from the Washington Department of Fish and Wildlife, the Applicant proposes to build this as part of the overhead system to minimize impacts on the riparian habitat between the two ridgetops. For these short overhead portions of the electrical collection system, wooden poles, non-reflective conductors, and non-refractive insulators would be used (Sagebrush Power Partners LLC 2003d). Overhead poles typically would be approximately 60 feet tall and positioned so that poles and electrical conductors are spaced at least 200 feet apart. The poles would be buried 8 to 10 feet deep. Pole insulators would be spaced four feet apart. Anti-perching devices would be installed on the poles to limit potential raptor use.

The electrical collection system would include junction boxes and pad-mounted switchgear panels that would be installed to connect cables coming from different directions and to allow for the isolation of particular turbine strings. In total, it is estimated that 15 junction boxes and 10 switch panels would be required for the electrical collection system (Sagebrush Power Partners LLC 2003c, Section 2.3.4).

Junction Boxes

The junction boxes would be either steel-clad or fiberglass panels mounted on pad foundations roughly 4 feet wide, 6 feet long, and 6 feet high. The pad foundation would have an underground vault about 3 feet deep where the underground cables come in. The junction boxes also would have a buried grounding ring with grounding rods tied to the collection system and a common neutral.

Switch Panels

The switch panels would be steel-clad enclosures mounted on pad foundations roughly 7 feet wide, 7 feet long, and 5 feet high. Switches would allow particular collector lines and turbines strings to be turned off or isolated. This isolation would allow maintenance and repair to take place without shutting down the entire project. The pad foundation would have an underground vault about 3 feet deep where the underground cables come in. Switch panels also would have a buried grounding ring with grounding rods tied to the collection system and a common neutral.

<u>Substations and Interconnection Facilities</u>

The Applicant is seeking a permit for and is designing the project so that it could interconnect with either the PSE or Bonneville electrical transmission lines traversing the site or possibly both. If connected to Bonneville's system, the project would interconnect directly with either the

Grand Coulee to Olympia 287-kV line or the Columbia to Covington 230-kV line. If connected to PSE's system, the project would interconnect directly with PSE's Rocky Reach to White River 230-kV line. There is the possibility that power would be fed to both the PSE and Bonneville systems; therefore, this analysis evaluates the need to construct two substations since the lines have different voltages.

The Applicant would build and maintain up to two fenced substation sites, each occupying approximately 3 acres. The proposed PSE substation would be in the northwest corner of the intersection of US 97 and Bettas Road, and the Bonneville substation would be approximately 2,200 feet southwest of the PSE substation, south of Bettas Road near the Bonneville transmission lines. The main function of the substations and interconnection facilities would be to step up the voltage from the collection lines (at 34.5 kV) to the transmission level (230 or 287 kV) to interconnect to the appropriate utility grid. The basic elements of the substation and interconnection facilities are a control house, two main transformers, outdoor breakers, relaying equipment, steel support structures, and overhead lightning suppression conductors. All of the elements would be installed on concrete foundations designed for site-specific soil conditions.

Meteorological Towers

Meteorological towers are used to measure wind conditions, including wind speed, direction, and temperature. The Applicant proposes to erect up to nine permanent meteorological towers in the project area, although it is likely that only four would be constructed. The potential location of the nine proposed permanent meteorological towers is shown in Figure 2-1. The permanent meteorological towers installed for the project would be approximately as tall as the turbine tower hub height (i.e., 150 to 262 feet) and would consist of a central lattice structure supported by three to four sets of guy wires that extend up to 100 to 210 feet from the base of each tower, on a 16-foot-by-16-foot base. The towers may alternatively be of a free-standing design. The meteorological towers would be constructed upwind of turbine strings or groups of turbine strings to monitor wind strength and to confirm turbine performance. Meteorological towers greater than 200 feet in height would require lighting in compliance with the Federal Aviation Administrations' (FAA) aviation safety lighting requirements (see the lighting discussion below for further detail).

Meteorological towers would be installed with a grounding system that protects the meteorological sensors and loggers from electrostatic discharge and lightning. Lightning dissipaters or rods would be installed at the tops of the towers to provide an umbrella of protection for the upper sensors (Sagebrush Power Partners LLC 2003c, Section 2.3.8).

Access Roads

Access to the various rows of turbines would be achieved by graveled access roads branching from US 97 and two county roads - Bettas and Hayward Roads. The project would improve some existing private roads and construct new gravel roads to provide access for construction vehicles and equipment. Up to approximately 7 miles of existing private roads would need to be improved and up to 19 miles of new roads would be constructed. Under the revised KVWPP layout, the length of new roads would be decreased from 19 miles to approximately 13 miles

(Schafer 2005f). The roads would be 24 feet wide including shoulders for small wind turbine generators (i.e., under the middle and upper end scenarios) and 34 feet wide including shoulders for larger wind turbine generators (i.e., under the lower end scenario) with a compacted gravel surface. In areas of steeper grades, a cut and fill design would be implemented to keep grades below 15% and to prevent erosion. After the project is constructed, use of the improved and new access roads on private lands would be limited to the landowner and to project maintenance staff.

Operation and Maintenance Facility

A permanent O&M facility would be constructed near the northwest corner of US 97 and Bettas Road. It would consist of approximately 5,000 square feet of enclosed space, including offices, spare parts storage, kitchen, restrooms, and a shop area. Water for the bathroom and kitchen would be obtained from a new domestic well; anticipated water use would be less than 1,000 gallons a day. Wastewater from the facility would be discharged to an onsite domestic septic system. There also would be graveled outdoor parking, a turnaround area for larger vehicles, outdoor lighting, and gated access with either partial or full perimeter fencing. The overall area of the building and parking would be approximately 2 acres. Vehicle access to the O&M facility would occur from Bettas Road.

Information Kiosk

An information kiosk and public viewing area near the proposed O&M facility off Bettas Road would be constructed. Signs would be provided to direct tourists to this site (Sagebrush Power Partners LLC 2003c, Section 5.3). Vehicle access to the information kiosk and public viewing area would occur from Bettas Road at the same location as the access to the O&M facility.

Safety Features and Control Systems

<u>Turbine Control Systems</u>

Wind turbines would be equipped with sophisticated computer control systems that would constantly monitor variables such as wind speed and direction, air and machine temperatures, electrical voltages, currents, vibrations, blade pitch, and yaw angles. The main function of the control system would be nacelle and power operations. Generally, nacelle functions include yawing the nacelle into the wind, pitching the blades, and applying the brakes if necessary. Power operations controlled at the bus cabinet inside the base of the tower include operation of the main breakers to engage the generator with the grid as well as control of ancillary breakers and systems. The control system would always run to ensure that the machines operate efficiently and safely.

Each turbine would be connected to a central Supervisory Control and Data Acquisition (SCADA) system. The SCADA system would allow for remotely controlling and monitoring individual turbines and the wind plant as a whole from both the central host computer or from a remote personal computer. In the event of faults, the SCADA system can also send signals to a fax, pager, or cell phone to alert operations staff. The turbine towers and foundations would be designed to survive a gust of wind more than 90 miles per hour (mph) with the blades pitched in their most vulnerable position, a speed which exceeds the 100-year expected peak gust of 73 mph in the project area and the recent maximum recorded gust of 56 mph.

Braking Systems

The turbines would be equipped with two fully independent braking systems that can stop the rotor either acting together or independently. The braking system is designed to be fail-safe, allowing the rotor to be brought to a halt under all foreseeable conditions. The system would consist of aerodynamic braking by the rotor blades and by a separate hydraulic disc brake system. Both braking systems would operate independently such that if there is a fault with one, the other can still bring the turbine to a halt. Brake pads on the disc brake system would be spring loaded against the disc, and power would be required to keep the pads away from the disc. If power is lost, the brakes would be mechanically activated immediately. The aerodynamic braking system also would be configured such that if power is lost it would be activated immediately using back-up battery power or the nitrogen accumulators on the hydraulic system, depending on the turbine's design.

After an emergency stop is executed, remote restarting is not possible. The turbine must be inspected in person and the stop-fault must be reset manually before operation could be reactivated. The turbines also would be equipped with a parking brake used to keep the rotor stationary while maintenance or inspection is performed.

Built-in Fire Safety

Each turbine's nacelle would be equipped with an internal fire detection system with sensors located in the nacelle as well as at the tower base. The fire detection system would be connected to the main controller and the central SCADA system. In the event of a fire, the turbine would be immediately halted and an alarm activated in the control system that can send a page or message to a cell phone of the on-call operators and/or the local fire district as required.

Climbing Safety

Normal access to the nacelle would be accomplished with a ladder inside the tower. Standard tower hardware would include equipment for safe ladder climbing including lanyards and safety belts for service personnel. Internal ladders and maintenance areas inside the tower and nacelle would be equipped with safety provisions for securing lifelines and safety belts.

Lightning Protection

The turbines would be equipped with an engineered lightning protection system that connects the blades, nacelle, and tower to a grounding system at the base of the tower. The grounding system would include a copper ring conductor connected to grounding rods driven down into the ground at diametrically opposed points outside the tower foundation. The system would provide a firm grounding path to divert harmful stray surge voltages away from the turbine. The blades would be constructed with an internal copper conductor and an additional lightning rod that extends above the wind vane and anemometer at the rear of the nacelle; both would have conductive paths to the nacelle bed frame, which in turn would connect to the tower.

Lighting

The Draft EIS explained that to comply with the Federal Aviation Administration's (FAA) aviation safety lighting requirements, the project turbines and met towers greater than 200 feet tall must be marked with lights. The Draft EIS anticipated that white lights would be required during the day, and red lights at night. The lights would be designed to concentrate the beam in the horizontal plane, minimizing light diffusion downward toward the ground and upward toward the sky.

Under recently released guidelines, the FAA would no longer require daytime lighting of the turbines if turbines are painted a light color. Nighttime lighting would be limited to the first and last turbine of every string, and to turbines located every 1000 to 1400 feet between the ends of the strings (Patterson 2005). As a result of these FAA changes, the KVWPP would no longer install white daytime aviation warning lights, and the number of red nighttime aviation warning lights would be significantly reduced. For example as shown in Addendum Figure 3.9-6, only 16 nighttime warning lights would be required.

The substations and O&M facility would be equipped with nighttime and motion-sensor lights for safety and security. Sensors and switches would be used to keep lights turned off when not required. Emergency lighting with back-up power is included to allow personnel to perform manual operations during an outage of normal power sources.

2.4 Construction Activities; Operation and Maintenance Activities; Decommissioning

The October 2005 revision to the KVWPP layout does not affect the description given in the Draft EIS of Construction Activities (Section 2.2.4 of the Draft EIS), Operation and Maintenance Activities (Section 2.2.5 of the draft EIS), and Decommissioning (Section 2.2.6 of the Draft EIS).

2.5 Analysis of off-site alternatives in the Draft Supplemental EIS

The description of the KVWPP given in the Supplemental Draft EIS was included to give context to the description of the affected environment and impacts of potential wind power projects on other hypothetical sites. Revisions to the KVWPP layout do not affect the analysis of off-site alternatives.